WHAT IS CLAIMED IS:

1. A laser beam modification system comprising:

a plurality of diffractive optical elements (DOEs) for modifying the size and shape of a laser beam produced from a commercial-grade laser diode, such as a VLD, over an extended range while avoiding the introduction of dispersion in the output laser beam.

2. The laser beam modifying system of claim 1, wherein the inherent astigmatism characteristics associated with said VLD are eliminated or minimized.

3. A DOE-based laser beam modifying system comprising:

a plurality of diffractive optical elements (DOEs) for modifying the size and shape of a laser beam produced from a commercial-grade laser diode, such as a VLD,

wherein beam dispersion is minimized, or normal dispersion or reverse dispersion characteristics are provided for any given beam compression or expansion ratio, by selecting the proper angle between said DOEs.

4. A DOE-based laser beam modifying system, wherein beam dispersion is minimized for the system acting alone, or fine-tuned to compensate for the dispersion of other elements preceding it or following the system.

5. A method of producing a laser beam having a desired spot-size over a specified depth of field, comprising the steps of:

(a) focusing said laser beam with a lens; and

(b) reshaping said laser beam using a pair of diffractive optical elements.

6. The method of claim 5, wherein said lens is realized as refractive element having symmetric surface profile characteristics.

7. The method of claim 5, wherein said lens is realized as variable DOE of a selected type.

8. A laser beam producing system comprising:

a set of first and second beam-modifying holograms which produce zero dispersion while simultaneously providing any desired aspect-ratio for the beam leaving (exiting) said second beam-modifying hologram.

9. An ultra-compact DOE-based device comprising:

means for collimating or focusing a laser beam produced from an astigmatic VLD while minimizing dispersion beam dispersion and correcting for beam ellipticity.

10. An ultra-compact optics module comprising:

means for modifying the aspect-ratio of a laser beams produced by a VLD;

means for eliminating beam astigmatism introduced by virtue of the inherent astigmatic difference in said VLD, and

means for minimizing dispersion in the output laser beam created by wavelength-dependent variations in the spectral output of the VLD.

11. An optics module comprising:

a pair of DOEs configured in the beam compression mode,

wherein the total expansion factor (M) of the DOE combination is less than one, so that the size of the laser beam in the plane of diffraction is compressed without changing the beam size in the dimension perpendicular to the plane of diffraction.

12. An optics module employing a pair of DOEs configured in the beam expansion mode, wherein the total expansion factor (M) of the DOE combination is greater than one, so that the size of the laser beam in the plane of diffraction is expanded without changing the beam size in the dimension perpendicular to the plane of diffraction.

13. A light diffractive optics module for incorporation into small laser scanning devices, such as laser scan-engines, as well as replacing conventional prisms and anamorphic lenses used in VLD-based optical systems such as optical storage devices, CD-ROM players and recorders, and like systems and devices.

14. A DOE-based optics module comprising:

means for modifying the aspect-ratio of a VLD beam while simultaneously controlling beam dispersion to minimize the overall dispersion of the optical system in which it is being used.

15. The DOE-based optics module of claim 14, wherein beam astigmatism inherently associated with said VLD is eliminated or minimized.

16. A method for designing a dual-DOE laser beam modifying system, in which a pair of equations are solved under a given set of conditions which ensures that beam dispersion is eliminated and a desired expansion factor (M) is obtained.

17. An optical design method, wherein analytical and spreadsheet-type programs are combined in an integrated fashion to allow for easy design and analysis of the optics module under consideration.

18. An optics module comprising:

one or more light absorbing surfaces for absorbing one or more zereoth-order beams diffracted from two or more DOEs employed in said DOE-based optics module.

19. A system for precisely and rapidly aligning the parameters of the optics modules of the present invention to enable the inexpensive mass production of such optical systems and devices for widespread use in diverse fields of endeavor.

20. A parameter alignment system, comprising:

means for micro-adjustment of the optical components of HOE-based laser beam producing modules under microcomputer control, thereby enabling mass-production of laser beam producing modules which satisfy high quality-control (QC) measures.

21. A method of producing a laser beam comprising the steps of:

(a) producing an astigmatic elliptical light beam from a VLD; and

(b) modifying said light beam so that it has a selected set of beam characteristics.

22. A hand-held laser scanner, wherein a DOE-based laser beam producing system is embodied for producing a laser beam for bar code scanning operations.

23. A body-wearable laser scanner, wherein a DOE-based laser beam producing system is embodied for producing a laser beam for bar code scanning operations.

24. A laser scanning-engine, wherein a DOE-based laser beam producing system is embodied for producing a laser beam for bar code scanning operations.

25. A holographic laser scanner wherein a DOE-based laser beam producing system is embodied for producing a laser beam for bar code scanning operations.

26. A CD-ROM playing unit, wherein a DOE-based laser beam producing system is embodied to enable the production of laser beams for reading information digitally recorded within a CD-ROM or like recording device.

27. A laser-based instrument, wherein a DOE-based laser beam producing system is embodied to enable the production of laser beams for diagnosis or detection of various conditions.

28. A DOE-based subsystem comprising:

a laser diode source for producing a laser beam; and

a pair of DOEs (D1 and D2) designed to satisfy a condition wherein that the beam-shaping factor M of said DOEs is less than unity and the narrower dimension of the laser beam exiting said laser diode source is oriented perpendicular to a common plane of incidence passing through said DOEs D1 and D2.

29. The DOE-based subsystem of claim 28, wherein said condition is satisfied by orienting the junction of said laser diode source (and thus its narrower beam dimension and polarization direction) perpendicular to the common plane of incidence, and the E-field of the incident laser beam perpendicular to the common plane of incidence, so that the wider dimension of the laser beam is disposed within the common plane of incidence (wherein diffraction occurs) so that beam compression results, while the narrower beam dimension is disposed perpendicular thereto (wherein no diffraction occurs) so that no beam compression results along said narrower beam dimension.

30. A DOE-based subsystem comprising:

a laser diode source for producing a laser beam; and

a pair of DOEs (D1 and D2) designed to satisfy a condition wherein the beam-shaping factor M for said DOEs is less than unity and the narrower dimension of the laser beam exiting said laser diode source is oriented parallel to the common plane of incidence passing through said DOEs D1 and D2.

31. The DOE-based subsystem of claim 30, wherein said condition is satisfied by orienting the junction of said laser diode source (and thus its narrower beam dimension and polarization direction) parallel to the common plane of incidence, and the E-field of the incident laser beam parallel to the common plane of incidence, so that the narrower dimension of the laser beam is disposed within the common plane of incidence (wherein diffraction occurs) so that beam compression results, while the wider beam dimension is disposed perpendicular thereto (wherein no diffraction occurs) so that no beam compression results along said wider beam dimension.

32. A DOE-based subsystem comprising:

a laser diode source for producing a laser beam; and

a pair of DOEs (D1 and D2) designed to satisfy a condition wherein the beam-shaping factor M thereof is greater than unity and the narrower dimension of the laser beam exiting the VLD is oriented perpendicular to the common plane of incidence passing through said DOEs D1 and D2.

33. The DOE-based subsystem of claim 32, wherein said condition is satisfied by orienting the VLD junction (and thus its narrower beam dimension and polarization direction) perpendicular to the common plane of incidence, and the E-field of the incident laser beam perpendicular to the common plane of incidence, so that the wider dimension of the laser beam is disposed within the common plane of incidence (wherein diffraction occurs) so that beam expansion results, while the

narrower beam dimension is disposed perpendicular thereto (wherein no diffraction occurs) so that no beam expansion results along said narrower beam dimension.

34. A DOE-based subsystem comprising:

a laser diode source for producing a laser beam; and

a pair of DOEs (D1 and D2) designed to satisfy a condition wherein the beam-shaping factor M of said DOEs is greater than unity and the narrower dimension of the laser beam exiting said laser diode source is oriented parallel to the common plane of incidence passing through DOEs D1 and D2.

35. The DOE-based of claim 34, wherein said condition is satisfied by orienting the junction of said laser diode source (and thus its narrower beam dimension and polarization direction) parallel to the common plane of incidence, and the E-field of the incident laser beam parallel to the common plane of incidence, so that the narrower dimension of the laser beam is disposed within the common plane of incidence (wherein diffraction occurs) so that beam expansion results, while the wider beam dimension is disposed perpendicular thereto (wherein no diffraction occurs) so that no beam expansion results along said wider beam dimension.

36. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD) for producing a laser beam from its junction typically having divergent and elliptical beam characteristics;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a S-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1 having a beam expansion factor M_1; and

a fixed spatial-frequency diffractive optical element (DOE) denotable by D2, having a beam expansion factor M_2.

37. The laser beam producing system of claim 36, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

38. The laser beam producing system of claim 36, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

39. The laser beam producing system of claim 36, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is less than unity (1), that is $M1*M2<1$, and thus the laser beam leaving the collimating lens (L1) is compressed in one dimension.

40. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction having divergent and elliptical characteristics;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a S-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1 having a beam expansion factor M_1;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D2, having a beam expansion factor M_2; and

a focusing lens L2, realizable as a refractive lens, a HOE, a DOE, a grin lens, or zone

plate(s), disposed after DOE D2 for focusing the output laser beam to a desired or required point in space.

41. The laser beam producing system of claim 40, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

42. The laser beam producing system of claim 40, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGH), a surface-relief hologram, and other diffractive optical element.

43. The laser beam producing system of claim 40, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is less than unity (1), that is $M1*M2<1$, and thus the laser beam leaving the collimating lens (L1) is compressed in one dimension.

44. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction ;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a S-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1 having a beam expansion factor M_1; and

a variable spatial-frequency diffractive optical element (DOE) denotable by D2, having a beam expansion factor M_2.

45. The laser beam producing system of claim 44, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s), and wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

46. The laser beam producing system of claim 44, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is less than unity (1), that is $M1*M2<1$, and thus the laser beam leaving the collimating lens (L1) is compressed in one dimension.

47. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing an elliptical divergent laser beam from its junction;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a S-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1;

a variable spatial-frequency diffractive optical element (DOE) denotable by D2 and adjustably mounted to enable, during the alignment stage of the system adjustment process, the principal plane of DOE D2 to be translated along its optical axis relative to the principal plane of DOE D1 without modifying the tilt angle between said DOEs D1 and D2; and

a focusing lens (L2) disposed after the second DOE D2 and having a focal length which is can be adjusted to enable the focusing of the output laser beam to some predetermined focal point in space, during the alignment stage of the system assembly process.

48. The laser beam producing system of claim 47, wherein said collimating lens (L1) is realized by

an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

49. The laser beam producing system of claim 47, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

50. The laser beam producing system of claim 47, wherein said focusing lens (L2) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a DOE, a grin lens, and zone plate(s).

51. The laser beam producing system of claim 47, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is less than unity (1), that is $M1*M2<1$, and thus the laser beam leaving the collimating lens (L1) is compressed in one dimension.

52. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a P-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1; and

a fixed spatial-frequency diffractive optical element (DOE) denotable by D2.

53. The laser beam producing system of claim 52, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other

type of DOE, a grin lens, and one or more zone plate(s).

54. The laser beam producing system of claim 52, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

55. The laser beam producing system of claim 52, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is greater than unity (1), that is M1*M2>1, and thus the laser beam leaving the collimating lens (L1) is expanded in one dimension.

56. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a P-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D2; and

a focusing lens (L2) disposed after the second DOE D2 for focusing the output laser beam to some point in space.

57. The laser beam producing system of claim 56, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

58. The laser beam producing system of claim 56, wherein each said DOE is realized by an optical

element selected from the group consisting of a HOE, a computer-generated hologram (CGH), a surface-relief hologram, and other diffractive optical element.

59. The laser beam producing system of claim 56, wherein said focusing lens (L2) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a DOE, a grin lens, zone plate(s) or the like, disposed after said second DOE D2, for focusing the output laser beam to some point in space.

60. The laser beam producing system of claim 56, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is greater than unity (1), that is M1*M2>1, and thus the laser beam leaving the collimating lens (L1) is expanded in one dimension.

61. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a P-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1; and

a variable spatial-frequency diffractive optical element (DOE) denotable by D2, which can be translated along the optical axis relative to the principal plane of DOE D1 during the alignment stage of the system assembly process.

62. The laser beam producing system of claim 61, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

63. The laser beam producing system of claim 61, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

64. The laser beam producing system of claim 61, wherein each of said DOEs is realized by an optical element selected from the group consisting of a DOE, a CGH, a surface-relief hologram, and other diffractive optical element.

65. The laser beam producing system of claim 61, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is greater than unity (1), that is M1*M2>1, and thus the laser beam leaving the collimating lens (L1) is expanded in one dimension.

66. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD);

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a P-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1;

a variable spatial-frequency diffractive optical element (DOE) denotable by D2, adjustably mounted relative to DOE D1; and

a focusing lens (L2) disposed after the second DOE D2, and adjustably mounted relative thereto, for focusing the output laser beam to some point in space.

67. The laser beam producing system of claim 66, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other

type of DOE, a grin lens, and one or more zone plate(s).

68. The laser beam producing system of claim 66, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

69. The laser beam producing system of claim 66, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is greater than unity (1), that is M1*M2>1, and thus the laser beam leaving the collimating lens (L1) is expanded in one dimension.

70. The laser beam producing system of claim 66, wherein each of said DOEs is realized by an optical element selected from the group consisting of a HOE, a CGH, a surface-relief hologram, and other diffractive optical element.

71. The laser beam producing system of claim 66, wherein said focusing lens (L2) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a DOE, a grin lens, and zone plate(s).

72. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in an S-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D2; and

a focusing lens (L2) disposed between DOE D1 and DOE D2 and adjustably translatable along its optical axis for focusing the output laser beam to some point in space.

73. The laser beam producing system of claim 72, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

74. The laser beam producing system of claim 72, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

75. The laser beam producing system of claim 72, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is less than unity (1), that is $M1*M2<1$, and thus the laser beam leaving the collimating lens (L1) is compressed in one dimension.

76. The laser beam producing system of claim 72, wherein each of said DOEs is realized by an optical element selected from the group consisting of a HOE, a CGH, a surface-relief hologram, and other diffractive optical element.

77. The laser beam producing system of claim 72, wherein said focusing lens (L2) is realized by an optical element selected from the group consisting of a refractive lens, holographic optical element (HOE), diffractive optical element (DOE), grin lens, and zone plate(s).

78. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its

junction;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a S-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1;

a variable spatial-frequency diffractive optical element (DOE) denotable by D2, adjustably translatable relative to the principal plane of DOE D1 during the alignment stage of the system assembly process; and

a focusing lens (L2) disposed between DOE D1 and DOE D2 and adjustably translatable along its optical axis during the parameter alignment stage of the system assembly process for focusing the output laser beam to some point in space.

79. The laser beam producing system of claim 78, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

80. The laser beam producing system of claim 79, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

81. The laser beam producing system of claim 79, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is less than unity (1), that is M1*M2<1, and thus the laser beam leaving the collimating lens (L1) is compressed in one dimension.

82. The laser beam producing system of claim 79, wherein each of the DOEs is realized by an optical element selected from the group consisting of a HOE, a CGH, a surface-relief hologram,

and other diffractive optical element.

83. The laser beam producing system of claim 79, wherein said focusing lens (L2) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a DOE, a grin lens, and zone plate(s).

84. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a P-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D2; and

a focusing lens (L2) disposed between DOE D1 and DOE D2 and adjustably translatable along its optical axis during the alignment stage of the system assembly process for focusing the output laser beam to some point in space.

85. The laser beam producing system of claim 84, wherein said collimating lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

86. The laser beam producing system of claim 84, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

87. The laser beam producing system of claim 84, wherein each of said DOEs is realized by an

optical element selected from the group consisting of a HOE, a CGH, a surface-relief hologram, and other diffractive optical element.

88. The laser beam producing system of claim 84, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is greater than unity (1), that is $M1*M2>1$, and thus the laser beam leaving the collimating lens (L1) is expanded in one dimension.

89. The laser beam producing system of claim 84, wherein said focusing lens (L2) is realized by an optical element selected from the group consisting of a refractive lens, holographic optical element (HOE), diffractive optical element (DOE), grin lens, and zone plate(s) or the like.

90. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

a collimating lens (L1) for collimating the laser beam as it is transmitted through collimating lens L1 and through the system in a P-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1;

a variable spatial-frequency diffractive optical element (DOE) denotable by D2, adjustably translatable relative to the principal plane of DOE D1 during the alignment stage of the system assembly process; and

a focusing lens (L2) disposed between DOE D1 and DOE D2 and adjustably translatable along its optical axis during the parameter alignment stage of the system assembly process for focusing the output laser beam to some point in space.

91. The laser beam producing system of claim 90, wherein said collimating lens (L1) is realized by

an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

92. The laser beam producing system of claim 90, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

93. The laser beam producing system of claim 90, wherein each of said DOEs is realized by an optical element selected from the group consisting of a HOE, a CGH, a surface-relief hologram, and other diffractive optical element.

94. The laser beam producing system of claim 90, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is greater than unity (1), that is M1*M2>1, and thus the laser beam leaving the collimating lens (L1) is expanded in one dimension.

95. A laser beam producing system of claim 90, wherein said focusing lens (L2) is realized by an optical element selected from the group consisting of as a refractive lens, a HOE, a CGH or other a DOE, a grin lens, and zone plate(s).

96. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

an imaging lens (L1) for imaging the laser source to the focal distance as it is transmitted through imaging lens L1 and through the system in a S-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1; and

a fixed spatial-frequency diffractive optical element (DOE) denotable by D2.

97. The laser beam producing system of claim 96, wherein said imaging lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

98. The laser beam producing system of claim 96. wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, and other diffractive optical element.

99. The laser beam producing system of claim 97, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is less than unity (1), that is M1*M2<1, and thus the laser beam leaving the collimating lens (L1) is compressed in one dimension.

100. The laser beam producing system of claim 98, wherein each of the DOEs is realized by an optical element selected from the group consisting of a HOE, a CGH, a surface-relief hologram, and other diffractive optical element.

101. The laser beam producing system of claim 99, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is less than unity (1), that is M1*M2<1, and thus the laser beam leaving the collimating lens (L1) is compressed in one dimension.

102. A laser beam producing system comprises:

a laser beam source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

a focusing lens (L1) for focusing the laser beam as it is transmitted through focusing lens L1 and through the system in a P-incident manner;

a fixed spatial-frequency diffractive optical element (DOE) denotable by D1; and

a fixed spatial-frequency diffractive optical element (DOE) denotable by D2.

103. The laser beam producing system of claim 102, wherein said focusing lens (L1) is realized by an optical element selected from the group consisting of a refractive lens, a HOE, a CGH, other type of DOE, a grin lens, and one or more zone plate(s).

104. The laser beam producing system of claim 102, wherein each said DOE is realized by an optical element selected from the group consisting of a HOE, a computer-generated hologram (CGHs), a surface-relief hologram, or other diffractive optical element.

105. The laser beam producing system of claim 102, wherein the total beam-shaping factor ($M=M_1M_2$) for the laser beam modifying subsystem is greater than unity (1), that is M1*M2>1, and thus the laser beam leaving the collimating lens (L1) is expanded in one dimension.

106. The laser beam producing system of claim 102, wherein each of said DOEs is realized by an optical element selected from the group consisting of a HOE, a CGH, a surface-relief hologram, and other diffractive optical element.

107. A laser beam production module for producing a laser beam having a pre-specified beam aspect-ratio, zero beam dispersion and a predetermined focus.

108. A laser beam production module for producing a laser beam, comprising:

means for achieving a pre-specified beam aspect-ratio;

means for achieving zero or minimum beam dispersion;

means for focusing said laser beam to a predetermined distance; and

means for correcting the astigmatism in said laser beam exiting said module.

109. A laser beam production module for producing a laser beam, wherein its aspect-ratio is controlled, its beam dispersion is zero (or minimized), its astigmatism corrected, its focus set to a predetermined distance, and its focal length adjusted.

110. A laser beam production modules for producing a laser beam having a pre-specified beam aspect-ratio, zero beam dispersion and astigmatism control.

111. A laser beam producing device, comprising:

a laser diode source, such as a visible laser diode (VLD), for producing a laser beam from its junction;

a first diffractive optical element (DOE) denotable by D1; and

a second diffractive optical element (DOE) denotable by D2, disposed adjacent said first DOE D1;

refractive optics (L1) having an axially symmetric surface profile characteristics, and being disposed between said laser diode source and said first and second diffractive optic elements (DOEs D1 and D2), so that said DOEs modify (e.g. correct or eliminate) astigmatism in the output laser beam from said device.

112. The laser beam producing device of claim 111, wherein said reflective optics comprises an refractive lens (L1).

113. The laser beam producing device of claim 112, which further comprises means for adjusting the x, y and z position of said laser diode source, relative to said refractive lens, during assembly of said laser beam producing device, for minimizing dispersion in the output laser beam from said laser beam producing device and for eliminating or minimizing astigmatism in said output laser beam, or focusing said output laser beam to a desired focus.